Title: The Hundred Day Quilt

Brief Overview:

Children will gain a working knowledge of patterns and the hundreds board using daily and weekly activities and incorporating the theme of the Hundred Day Celebration.

Note to Teachers: The final product will be a quilt of 100 construction paper squares with ten squares in each row (like a hundreds board). Squares should be cut to 4 inches to allow for space to overlap when gluing squares together. Patterns of the quilt will vary, given the size of your class. Each day of the project, a group will be responsible for making and adding their square.

Links to Standards:

- **Mathematics as Problem Solving**
  Students will demonstrate their ability to solve problems in mathematics including problems with open-ended answers, problems which are solved in a cooperative atmosphere, and problems which are solved with the use of technology.

- **Mathematics as Communication**
  Students will demonstrate their ability to communicate mathematically. They will read, write, and discuss mathematics with language and the signs, symbols, and terms of the discipline.

- **Mathematics as Reasoning**
  Students will demonstrate their ability to reason mathematically. They will make conjectures, gather evidence, and build arguments.

- **Mathematical Connections**
  Students will demonstrate their ability to connect mathematics topics within the discipline and with other disciplines.

- **Estimation & Computation**
  Students will demonstrate their ability to apply estimation strategies in computation, with the use of technology, in measurement, and in problem solving. They will determine reasonableness of solutions.

- **Number Sense & Operations**
  Students will demonstrate their ability to describe and apply number relationships using concrete and abstract materials. They will choose appropriate operations and describe effects of operations on numbers.

- **Measurement**
  Students will demonstrate and apply concepts of measurement using non-standard and standard units and metric and customary units. They will estimate and verify measurements. They will apply measurement to interdisciplinary and real-world problem solving situations.

- **Patterns & Relationships**
  Students will demonstrate their ability to recognize numeric and geometric relationships and will generalize a relationship from data.

Grade/Level:

Grades 2-3 (could be modified for upper or lower grades)

Duration/Length:

Eight activities spread over 100 days.

Prerequisite Knowledge:

Students should have working knowledge of the following skills :

- Basic plane geometric figures
- Measurement techniques
- Letter writing--preferably reviewed at beginning of year
- Work cooperatively in group

Objectives:

Students will:

- work cooperatively in groups.
- use geometric shapes to create a pattern.
- estimate and predict size and pattern relationships.
- continue and build upon patterns.
- write to inform.
- acquire background knowledge about mathematics through literature.
- write to reflect.

Materials/Resources/Printed Materials:

- hundreds boards/charts
- pattern blocks/templates (Teacher Resource Sheet #5)
- counters
- scissors
- two colors of construction paper cut into 3 1/2 inch squares
- calculator
- rulers
- glue
- Teacher's Resource Sheets #1,2,3,4,5
- The Patchwork Quilt by Valerie Flournoy
- quilt or picture of a quilt
- overhead transparency and counters or large hundreds board
- pattern block stickers (optional)

Development/Procedures:

Activity 1: Exploring the Hundreds Board

Day 1:

Each child has a hundreds board and a supply of counters. Discuss with children some patterns that they see. Challenge student pairs to find at least three patterns on the board, share with their partner and record.

Students will then share some of their patterns on the overhead and describe them to the class. Terminology can be recorded. Some patterns which may be noticed are:

- All of the numbers in the last row end in zero
- going down all of the rows the ones place stays the same
- going across all of the rows the tens place stays the same while the ones place goes up by one each time
- going diagonally from ten down the two digits add up to ten

Day 2:

Using the hundreds board, explore with the class the patterns made with numbers and their multiples (skip counting). Then group the students and assign each group a number . Have them cover the assigned number and its multiples with counters on the chart. Repeat the group activity with other numbers. Ask the students to discuss the patterns they find. At the end of the lesson, have the children choose their favorite pattern and color it on their hundreds board. (NCTM Curriculum and Evaluation Standards: Addenda Series for Patterns)

Activity 2: The Patchwork Quilt by Valerie Flournoy

Use KWL chart to discuss prior knowledge about quilts. Introduce story, The Patchwork Quilt, and read aloud. Complete the KWL chart. Using quilt or picture of a quilt, have students look at and discuss the patterns and shapes they see in the quilt. Students can write in their journal to answer the question, "how are patterns and quilts related?"

Activity 3: Exploring Pattern Blocks

Begin by having students explore blocks through free exploration. Teacher will model various patterns on the overhead and children will copy them using the blocks. Choose a child to demonstrate on the overhead and display a pattern which the other children will model. Children will now create their own patterns. After some experimentation, children will choose a pattern to trace, color and display.

Activity 4: Naming Patterns

Children will be solving a problem involving making patterns with pattern blocks.

Problem: Your teacher has asked you to help design a border for one of her bulletin boards. She has given you a bag of pattern blocks to plan your border. Her only rule is that the shapes must be in a line and make a repeating pattern. You must repeat the pattern three times. Plan your border and draw it on the paper.

Groups should have a bag with 18 blocks (6 each of three shapes). After students have worked on solving the problem, have groups share by taping it up. Compare and contrast the different patterns orally. Then begin to label the patterns using ABC.

For example triangle, triangle, square, rhombus, triangle, triangle, square, rhombus, triangle, triangle, square, rhombus is AABC.
Terminology should be introduced: core, repeating pattern, term, sequence and relationship. (Teacher note: core--the part of the pattern that is repeated, term--each piece of the core) The core of this pattern is triangle, triangle, square, rhombus. A triangle is one of the terms of the pattern.

Activity 5: Beginning the Quilt

Teacher Note: The quilt will have two overall patterns; the pattern of the background (Step 2) and the pattern of the shapes on the squares (Step 1)

Step 1: Refer back to the quilt used in Activity 2. Arrange the children into cooperative groups from Day 2. Give each group a bag of 3 selected pattern block shapes (3 of each shape). Have groups work to make and record all of the possible patterns. Share them as a whole class and teacher records the possible patterns. Then the class may vote on the pattern they wish to use for the entire quilt. There will be only one shape per square and the pattern of the squares must repeat. After the students have chosen a pattern, record it on a chart and have the students label it using ABC letters.

Step 2: Displaying the hundreds board on the overhead or wall, make pattern of ABAB using two counter colors. Tell students that you will make the same type of pattern as the background squares for your quilt. Teachers may choose to have students use tally marks on a chart to denote their favorite and then decide. Note: Background colors should not be the same as the colors of the pattern blocks that will be used. Post background bulletin board paper in one color, add alternating squares of construction paper for second color.

Step 3: Set up a group rotation for adding their squares to the quilt. Each group will be responsible for a row of squares. For example: Group A may have the responsibility of adding the correct pattern square each day for the first row of the quilt (ten school days), then group B for row two and so on.

Quilt Square Center: A center should be set up within the classroom to allow a group of students each day to make their square for the day and glue it. The center should include: cut squares of paper, pattern blocks/templates, crayons, scissors, glue and schedule for rotation. (Use larger pattern piece than manipulative size.)

Activity 6: Ongoing Reflection and Journal Writing

On each tenth day (days 10,20,30,40,50,60,70,80) the students should study the patterns that are forming on the quilt and make a journal entry. Day 10-teacher will model how to make the math journal entry, introducing the rubric. On successive journal days, students will be writing independently.

Sample Questions for Journal Entries:

- Describe one pattern that you see and explain it.
- Describe a pattern from the quilt. How do you know it is a pattern?
- Describe two patterns on the quilt. How are they alike and different?
- **Given that each square is five inches, how long do you think our quilt will be when we have finished.** (Leads to culminating activity.)

Mental Math Sample Questions:

- How many more days until the 100th day?
- Count days by multiples of 2 and 5.

Activity 7: Inviting Dignitaries (to occur on day 90)

Students will design and write an invitation to various school personnel and/or other classes to invite them to see their quilt on the hundredth day. Students should use the prompt on Teacher Resource Sheet # 1 ,the FATP, and discuss the rubric (Teacher Resource Sheet #2) before beginning. Each group will use their pattern from their quilt square to design the front of the invitation.

Activity 8: Culminating Activities (The Hundredth Day)

- Children will make a final journal entry using a prompt, Teacher Resource Sheet #3, share and display.
- Have children measure the quilt, compare their actual measurement to their estimate from Activity 5, and calculate to find the difference between the two numbers. Problem: Your bed is 60 inches long. Would a quilt of this size fit your bed? Explain your answer.
- Children will place numbers 1-100 on the quilt in sequential order to make a hundreds board.
- A party may be planned to celebrate the hundredth day of school, including refreshments, cake decorated as a quilt, etc. Note: Children may decorate squares of the cake using cake decorations or frosting.

Performance Assessment:

- Activity 6: Teacher may use journal entries on every tenth day to assess.
- Activity 7**:** Invitation may be scored using the language rubric.
- Activity 8: Measurement problem may be scored using the math rubric.
- Activity 8: Final journal entry may be scored using the math rubric.

Extension/Follow Up:

- Read such books as: The Hundred Penny Box by Sharon Bell Mathis, I Can Count to 100. Can You? by Katherine Howard, Pattern by Henry Pluckrose, and One Hundred Hungry Ants by Elinor Piones.
- The quilt can be used throughout the year to connect mathematical concepts such as place value, odd/even, multiples, etc.
- Using the quilt with the numbers, work to translate the patterns they see into number patterns. Children can then find the rule for each number pattern.
- Using a table have the students find all of the possible combinations for pattern blocks. For example, for a quilt with two background colors and five pattern blocks, there will be 10 possible combinations.
- Books to share for quilts: Sewing Quilts by Ann Turner, The Quilt Story by Tony Johnston and Tomie dePaola, Beautiful Quilts: Amish and Mennonite by Katharine Guerrier, Erica Wilson's Quilts of America by Erica Wilson.

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Teacher Resource Sheet #1

Writing the Invitation

Use the prompt to read and plan what you will write about today.

Our hundred day celebration is coming up soon and we have worked hard to make our quilt. We would like to share it with others. We will need to make an invitation to ask them to view the quilt.

*Think abouts:
*Who will we invite?
*What information is it important to include on an invitation?
*How should we design our invitation?

Form

Audience

Topic

Purpose

Teacher Resource Sheet #2

Rubric for Invitation

3 Uses correct form for invitation.
Accurately provides information.
Uses proper grammar, spelling, and punctuation.

2 Uses correct form for invitation.
Provides partial information.
Usually uses proper grammar, spelling, and punctuation.

1 Incorrect form for invitation.
Provides little information.
Incorrect grammar, spelling, and punctuation.

Teacher Resource Sheet #3

Journal Entry for the Hundred Day Quilt

We have completed our quilt! Now let's look at the patterns we have made.

Imagine that you want to describe the quilt to your Great Aunt Matilda who lives in California. She can't see the quilt and your camera is broken. How can you describe the patterns so that she will understand what your quilt looks like?

Choose three of the patterns and describe them. Be specific.

Think and write about:
***What math language can you use in describing the patterns?**
***What other details might you need to give her about the quilt?**

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Teacher Resource Sheet #4

Generic Rubric for Math Writing and Problem Solving

3	Solves the problem or answers the questions correctly. Uses an abundance of math language. Uses drawings, labels, number sentences, tables and/or diagrams to explain the answer. Clearly explains thinking.
2	Solves the problem or answer the question correctly. Uses some math language. Uses drawings, labels, number sentences, tables or diagrams to explain the answer. Explains thinking with some ambiguity.
1	Solves some of the problem incorrectly. Uses little math language. Does not use drawing, labels, number sentences, tables or diagrams to explain the answer. Thinking is not clearly explained.
No Score	Solves the problem incorrectly. Uses no math language. Does not use drawing, labels, number sentences, tables or diagrams to explain the answer. Does not explain thinking, or unable to comprehend explanation.

Template for Pattern Blocks